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ABSTRACT

A teaching unit illustrates how the application of certain common classification systems, using the same data set, can produce different spatial configurations on choropleth maps. It is hoped that students, after completing the unit, will not only take greater care in deciding upon a classification system to use on their own choropleth maps, but also that they will become more critical in their analyses of all such maps. Students are presented with data and then shown several ways of classifying data into groups for making maps. The classification schemes used are: natural grouping--the boundaries of each data group are located where natural breaks occur; constant intervals--the numerical range of each class is the same; quantiles--equal size data groups; and quantitative--the use of standard deviation of the data array to set the class limits. Students must then produce five choropleth maps. After the maps have been completed, the students compare them and discuss the differences found in the spatial arrangements of the shading patterns. Diagrams containing data and sample maps are provided in the unit. (RM)

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CHOROPLETH MAPPING: THE PROBLEMS OF CLASSIFICATION AND DATA PRESENTATION

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ABSTRACT: This paper discusses the importance of data classification when choropleth maps are being constructed. The teaching unit and case study demonstrate how different classification systems can produce different maps even when the same data and base maps are used.

KEY WORDS: Geography, Cartography, Choropleth Maps, Teaching Unit.

CHOROPLETH MAPPING: THE PROBLEMS OF
CLASSIFICATION AND DATA PRESENTATION

Choropleth maps are used widely in Geography. As a result, the technique of choropleth mapping is part of many skills oriented courses in addition to cartography. Although a relatively simple mapping format, great care must be taken when such maps are being planned. Decisions about scale, shading patterns, classification systems and the like can alter the representation of the spatial patterning on each of the finished maps and thus change the tenor of subsequent narratives.

The aim of this paper is not to discuss the merits or the techniques of data presentation. Rather the thrust is to produce a teaching unit that will illustrate to students how the application of certain common classification systems, using the same data set, can produce different spatial configurations on choropleth maps. After completing this project, it is hoped that students will not only take greater care in deciding upon a classification system to use on their own choropleth maps but also that they will become more critical in their analyses of all such maps.

The Project

Given a data set organized as a scattergram (see Diagram I) and a hypothetical region divided into 24 areas in which the data from the scattergram has been included (see Diagram II). The students are then shown several ways of classifying data into groups for mapping. In this example four different types of classification systems were

used (see Diagram III):

(a) Natural Grouping -- the boundaries of each data group are located where natural breaks occur on the scattergram.

(b) Constant Intervals -- the numerical range of each class is the same: for example, 61-70, 71-80, 81-90 etc.

(c) Quantiles -- equal size data groups. In this example two quantiles were used: the first divided the data into three equal sized groups; and the second contained four groups of equal size.

(d) Quantitative -- the use of the standard deviation of the data array to set the class limits: above plus one standard deviation; plus one to minus one standard deviation; and below one standard deviation.

The students may be given the raw data or the five scattergrams (minus the arrows that indicate where the boundaries of each grouping occur). By the use of the grouping techniques described above, further discussed by the instructor, the students should group the data and then produce five choropleth maps, (see Diagrams IVa-e).

After the five maps have been completed the students should be made to compare them and discuss the differences found in the spatial arrangements of the shading patterns. It is imperative that the students realize that in classification systems for choropleth maps:

> Whichever method is chosen, it must be remembered that classification is not an end in itself. The final decision over both the number of classes,

and their limits, should reflect the purpose for which the classification is made.[1]

Conclusion

This project has proven to be a valuable tool in teaching choropleth mapping as it allows the students to see the different visual patterns that can emerge from a single distribution of data. In addition, it forces students to view their own work more critically and makes them more cautious when using choropleth maps produced by others. It is important that our students be made to realize that specific spatial patternings in publications may have been chosen to suit a map maker's particular viewpoint and that other data classification systems, producing different distributional patterns, may have been just as valid.

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[1]Peter Davis, Data Description and Presentation, London, Oxford University Press, 1974, page 63.

DIAGRAM 1 Scattergram

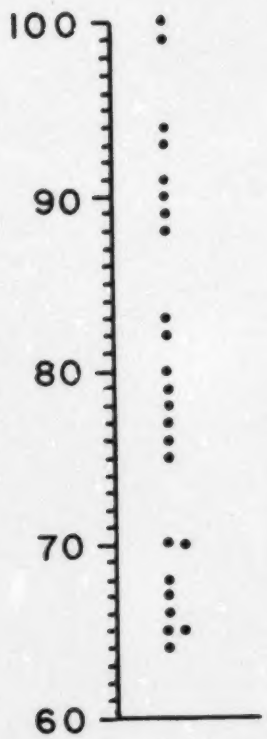

DIAGRAM II

100	99	93	90	94	91
82	83	89	88	80	79
70	77	76	75	78	70
68	67	66	65	65	64

DIAGRAM III

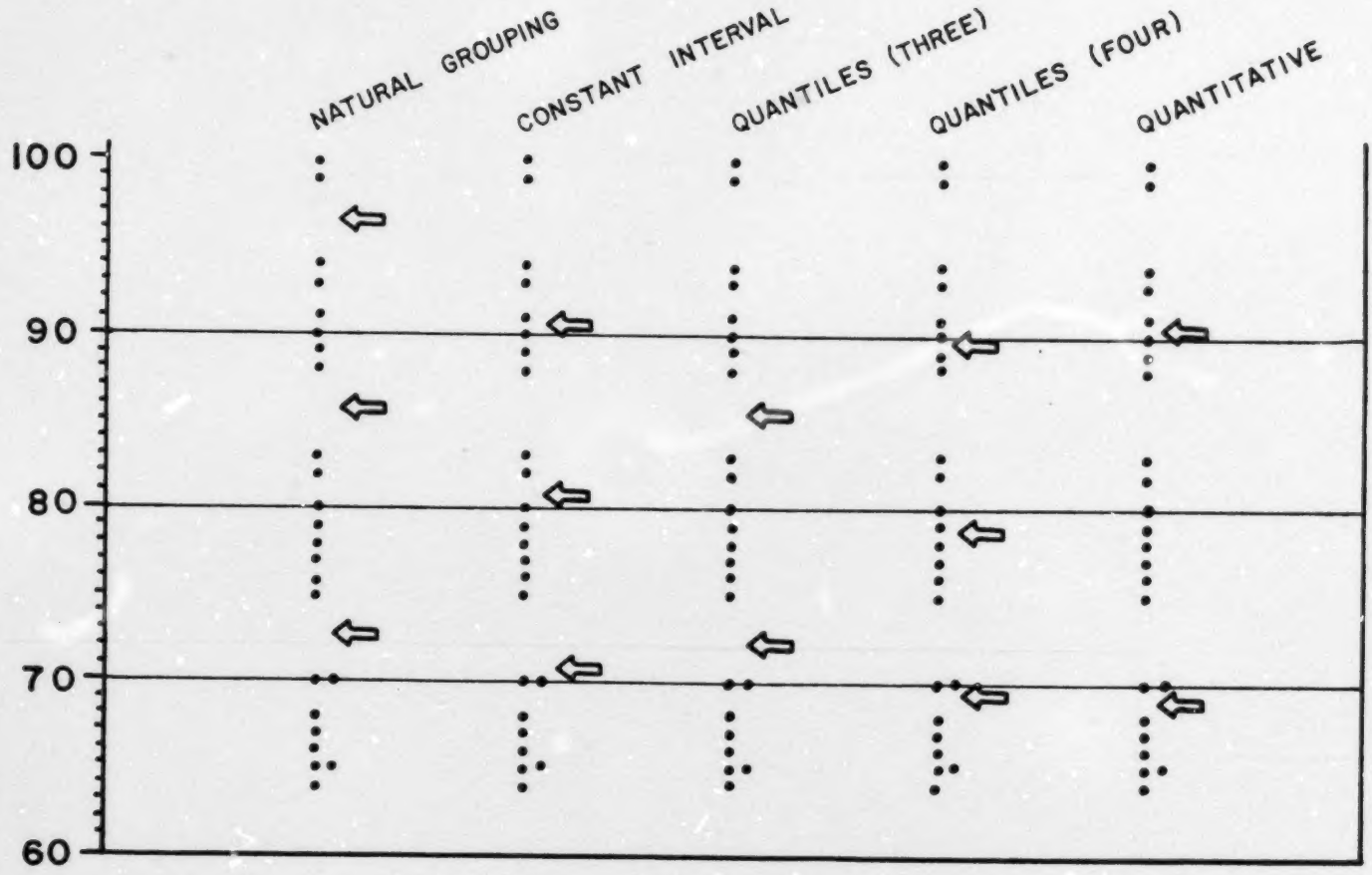
NATURAL GROUPING
CONSTANT INTERVAL
QUANTILES (THREE)
QUANTILES (FOUR)
QUANTITATIVE
100
90
80
70
60

DIAGRAM IVa Natural Grouping

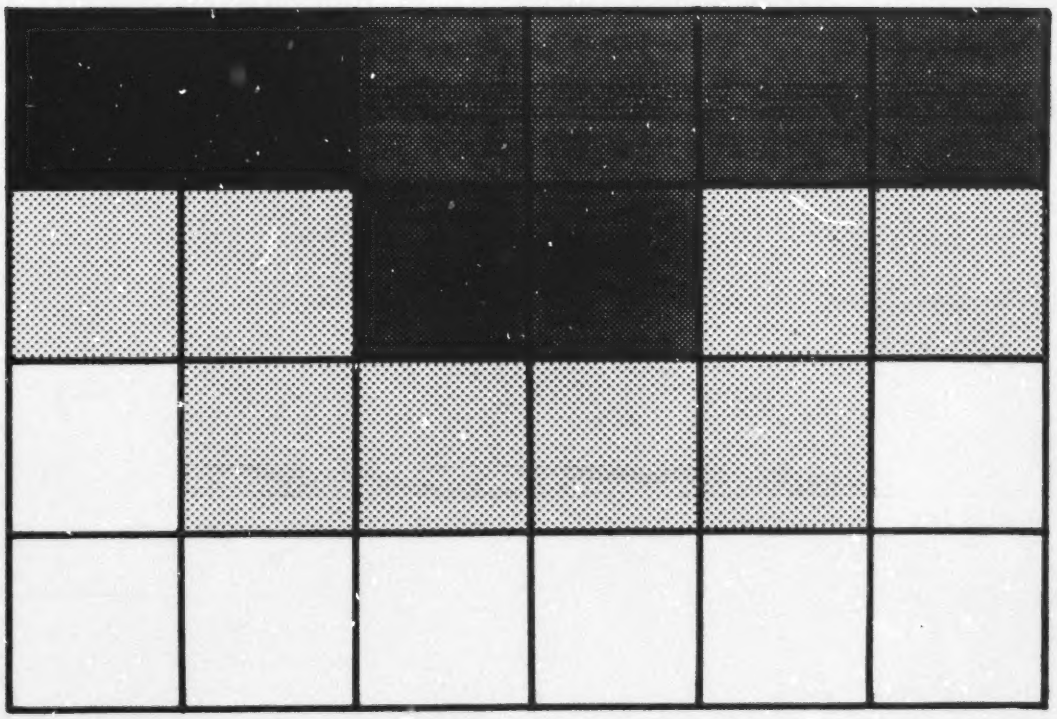

DIAGRAM IVb Constant Interval

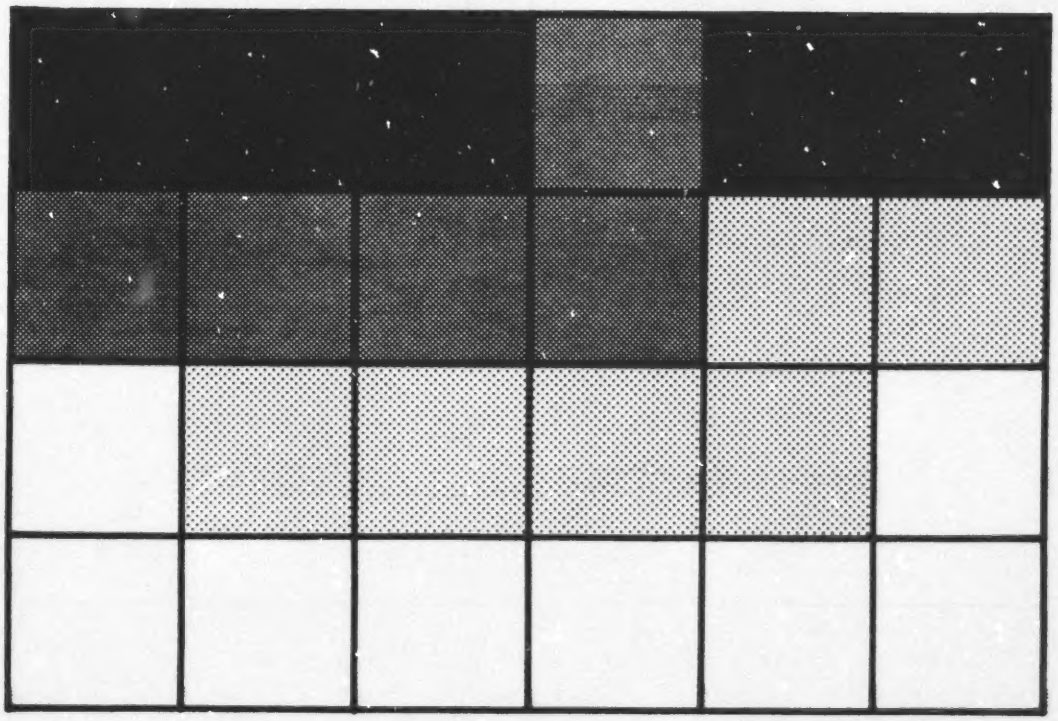

DIAGRAM IVc Quantiles – Three Groups

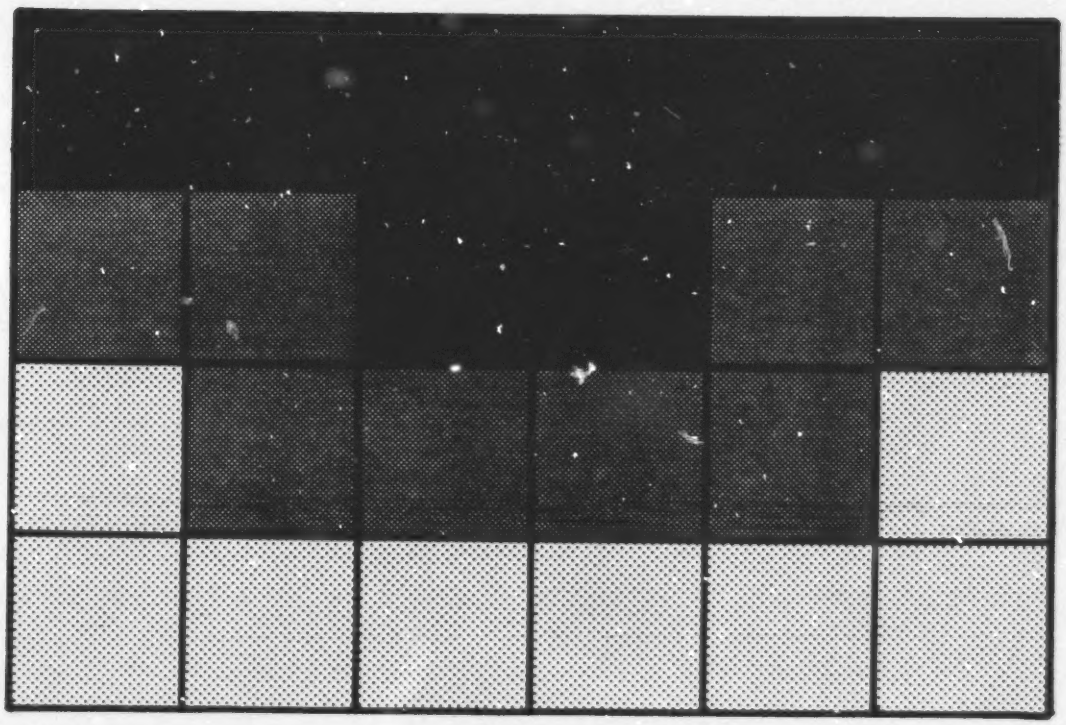

DIAGRAM IVd Quantiles — Four Groups

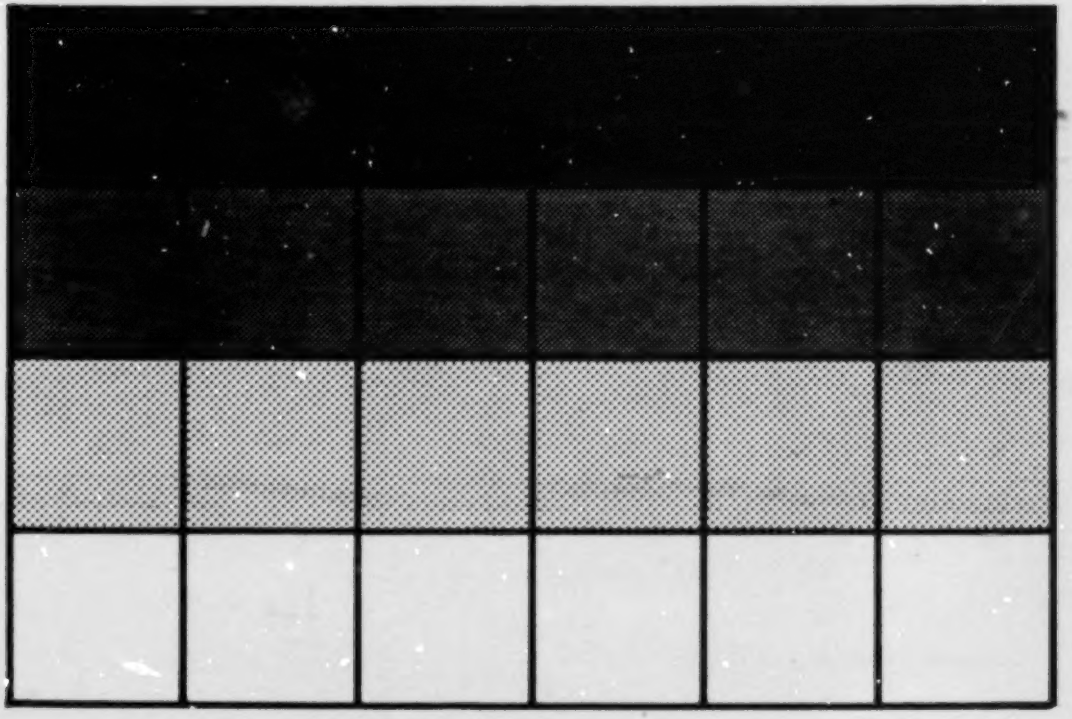

DIAGRAM IVe Quantitative